

OFFSETS

**Neutralizing what's left by
paying someone else to do it!**

Offset Option 1

Certified Emission Reduction (CER) under Kyoto Protocol rules, purchased over-the-counter from EU-Emission Trading Scheme

- **Price: USD\$ 25 per credit (but varies daily)**
- Highest standard of certification, no project details available. Money goes to seller of credits who is likely a bank/broker who bought them earlier from project owner.

Offset Option 2

Gold Standard VER from Wind Power Project in China

- **Price: USD\$ 20 per credit**
- High standard of certification, renewable energy project developed sustainably in rural China with full local consultation. Foreign-owned and money goes to investors.

Offset Option 3

Plan Vivo Sustainable Forestry Credits, currently only available from projects in Uganda and Mexico

- **Price: USD\$ 15 per credit**
- Currently highest standard of certification for land use projects, encourages farmers to plant and maintain native trees and promotes sustainable local livelihoods. Money goes 70% to farmers and 30% to administration costs.

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Offset Option 4

VER certified to VCS (Voluntary Carbon Standard) from Coal Mine Methane project in China

- **Price: USD\$ 10 per credit**
- Solid industry accepted standard of certification, mine safety project burning explosive gas extracted from coal mining. Money goes to Chinese government mining enterprise or local tycoon.

Offset Option 5

Purchase VERs from unspecified project in China via Chicago Climate Exchange (CCX)

- **Price: USD\$ 5 per credit**
- Reductions have no standard of certification, project details not known, bought over-the-counter. Money will go to projects via a series of middle men.

Offset Option 6

Plant some trees in a deforested area somewhere near the school in Beijing

- **Price: Rough cost estimate is USD\$ 15 per tree (allows for labor, water, fertilizer etc) but not land Carbon saved is about 750 kg per tree, so effective price of the offset is USD\$ 20 per credit**
- Depends on available cheap land and water, depends on tree lasting 100 years, and eventually may release carbon. Located in China and will also improve local climate. Tree planting should be witnessed and monitored to ensure offsets actually happen. Money goes to tree supplier and local community.

ON-SITE RENEWABLES

Generating our own energy from what's available on the campus.

Solar PV - the glamorous option!

Costs: 2m² of panels gives 270 Watts at peak, costs USD\$ 3,400

Generates: 200 kWh per year of electric power with **Net Value USD\$ 20**



Estimated carbon savings:

0.2 tonne per year (vs. electric grid)

Pros: Electricity is the most useful and versatile kind of energy

Cons: Really expensive, uses up the roof space, depends on the weather

Wind – works well in the right place.

Costs: 50KW turbine costs USD\$ 75,000 and needs a 1000m² area

Generates: 100,000 kWh per year of electric power with **Net Value USD\$ 8,000**



Estimated carbon savings:

100 tonne per year (vs. electric grid)

Pros: Mature technology, small sizes available, relatively affordable

Cons: Intermittent supply, reliability problems, noise

Sewage Biogas - stops harmful methane.

Costs: A small biogas capture and power module for a school of 1500 students costs USD\$ 24,000

Generates: Will produce a small amount of power, enough to offset its maintenance costs but **NO Net Value**



Estimated carbon savings:

80 tonne per year (mostly from methane destruction)

Pros: Low cost with high carbon impact, environmentally responsible waste treatment

Cons: Affected by climate, may freeze in winter

ON-SITE RENEWABLES

Generating our own energy from what's available on the campus.

Solar Thermal - a cost-effective option.

Costs: 2m² of panels equals 1.5kW heat power
Costs USD\$ 1,000

Generates: 2000 kWh per year HOT WATER
with **Net Value USD\$ 60**



Estimated carbon savings:
0.5 tonne per year (vs. natural gas)

Pros: Cheaper and proven – big in China!!

Cons: You need all year round use for the hot water, depends on the weather

Biomass - good if you can get it cheap!

Costs: 100kW biomass boiler, costs USD\$ 90,000

Generates: 700,000 kWh per year of **HOT WATER**, provided you have the biomass.
NO Net Value as biomass fuel is about the same price as natural gas



Estimated carbon savings:
180 tonne per year (vs. natural gas)

Pros: Reliable useable energy, as good as oil or gas

Cons: Some places have biomass supply problems – and prices can vary a lot

Heat Pumps - great if you have the space!

Costs: 20kW ground source heat pump costs USD\$12,000 and needs a 500m trench

Generates: 150,000 kWh per year of **HOT WATER**. **Net Value of USD\$ 1,600 (fuel cost saved less electricity used to drive heat pump)**



Estimated carbon savings:
40 tonne per year (vs. natural gas)

Pros: Reliable useable energy, as good as oil or gas, can also power AC in summer

Cons: Need a BIG or DEEP heat sink, may depend on locale

REDUCTIONS

Always the best place to start!

There are lifestyle changes which cost no money at all:

- Cycling/walking/skating to school

Every 30 students who get off the bus and either walk, cycle or skate would enable 1 bus to be taken out of service. This would **save 12.5 tonnes of carbon per year**.

In addition each bus less would save USD\$ 5,000 per year in diesel fuel costs.

- Reducing the heating and/or air-conditioning

Decreasing the heating or air-conditioning of a floor area of 1000m² by 1 degree C would **save 3 tonnes of carbon per year**. *(based on a full year, careful with your calculations...)*

The resulting savings in heating/cooling fuel costs would be USD\$ 450 per year per 1000m².

Modest investments can be made which save lots of carbon, and sometimes money too:

- Insulating the roof

Eighty percent of the heat loss in a building is through the roof – adding extra insulation on 1000m² building area would cost USD\$ 7,500 and would **save 15 tonnes of carbon per year**.

The resulting savings in fuel costs on this same 1000m² area are USD\$ 2,250 per year.

- Installing energy efficient lighting

One CFL light bulb costs USD\$ 2, it consumes ¼ of the energy of a conventional bulb for the same lighting power, it would **save 0.04 tonne of carbon per year**.

Each bulb would also save USD\$ 8.40 per year in electricity costs.

- Installing water saving devices

Water saving taps, toilets and urinals can reduce water consumption and save carbon. An investment of USD\$ 5000 would reduce usage by 25 cubic metres of water per day and would **save 2.5 tonnes of carbon per year**.

The cost of the water saved by this water saving project would be USD\$ 2,500 per year.

- Adjusting waste disposal processes

Recycling more waste to reduce land-fill saves carbon - every 1 cubic metre per day recycled rather than sent to landfill would **save 8 tonnes of carbon per year**.

There are no upfront costs for this, and no financial savings to the school, but there should be no extra costs either, if the recycling company provides bins and collection.